

SEQUENCE LISTING

<110> Luche, Ralf M.
Wei, Bo

<120> DSP-15 DUAL-SPECIFICITY PHOSPHATASE

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<141> 2001-09-18

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Leu	Leu	Val	Ala	Gln	Arg	Asp	Arg	Ala	Ser	Arg	Ile	Phe	Pro	His	Leu
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Tyr	Leu	Gly	Ser	Glu	Trp	Asn	Ala	Ala	Asn	Leu	Glu	Glu	Leu	Gln	Arg
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Val	Leu	Glu	Glu	Phe	Gly	Ile	Lys	Tyr	Ile	Leu	Asn	Val	Thr	Pro	Asn
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Leu	Pro	Asn	Leu	Phe	Glu	Asn	Ala	Gly	Glu	Phe	Lys	Tyr	Lys	Gln	Ile
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Val	His	Cys	Leu	Ala	Gly	Ile	Ser	Arg	Ser	Val	Thr	Val	Thr	Val	Ala
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Val	Leu	Gly	Lys	Tyr	Gly	Ile	Lys	Tyr	Ile	Leu	Asn	Val	Thr	Pro	Asn
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Pro	Ile	Ser	Asp	His	Trp	Ser	Gln	Asn	Leu	Ser	Gln	Phe	Phe	Pro	Glu
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Val	His	Cys	Leu	Ala	Gly	Ile	Ser	Arg	Ser	Val	Thr	Val	Thr	Val	Ala
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Tyr	Leu	Met	Gln	Lys	Met	Asn	Leu	Ser	Leu	Asn	Asp	Ala	Tyr	Asp	Phe
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Val	Lys	Arg	Lys	Lys	Ser	Asn	Ile	Ser	Pro	Asn	Phe	Asn	Phe	Met	Gly
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Ser	Leu	Ala	Lys	Leu	Gly	Ile	Arg	Tyr	Ile	Leu	Asn	Val	Thr	Pro	Asn
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Pro	Ile	Ser	Asp	His	Trp	Ser	Gln	Asn	Leu	Ser	Arg	Phe	Phe	Pro	Glu
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Val	His	Cys	Leu	Ala	Gly	Val	Ser	Arg	Ser	Val	Thr	Val	Thr	Val	Ala
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Tyr	Leu	Met	Gln	Lys	Leu	His	Leu	Ser	Leu	Asn	Asp	Ala	Tyr	Asp	Leu

	115		120		125	
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Leu	Met	Thr	Gln	Asn	Gly	Ile	Ser	Tyr	Val	Leu	Asn	Ala	Ser	Asn	Ser	
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Cys	Pro	Lys	Pro	Asp	Phe	Ile	Cys	Glu	Ser	Arg	Phe	Met	Arg	Val	Pro	
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Ile	Asn	Asp	Asn	Tyr	Cys	Glu	Lys	Leu	Leu	Pro	Trp	Leu	Asp	Lys	Ser	
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His	Cys	Leu	Ala	Gly	Ile	Ser	Arg	Ser	Ala	Thr	Ile	Ala	Ile	Ala	Tyr	
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Ile	Met	Lys	Thr	Met	Gly	Met	Ser	Ser	Asp	Asp	Ala	Tyr	Arg	Phe	Val	
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Lys	Asp	Arg	Arg	Pro	Ser	Ile	Ser	Pro	Asn	Phe	Asn	Phe	Leu	Gly	Gln	
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Gly	Leu	Gln	Ala	Cys	Gly	Ile	Thr	Ala	Val	Leu	Asn	Val	Ser	Ala	Ser	
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Cys	Pro	Asn	His	Phe	Glu	Gly	Leu	Phe	His	Tyr	Lys	Ser	Ile	Pro	Val	
	50					55					60					
Glu	Asp	Asn	Gln	Met	Val	Glu	Ile	Ser	Ala	Trp	Phe	Gln	Glu	Ala	Ile	
65				70						75				80		
Ser	Phe	Ile	Asp	Ser	Val	Lys	Asn	Ser	Gly	Gly	Arg	Val	Leu	Val	His	
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Cys	Gln	Ala	Gly	Ile	Ser	Arg	Ser	Ala	Thr	Ile	Cys	Leu	Ala	Tyr	Leu	
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Ile	Gln	Ser	His	Arg	Val	Arg	Leu	Asp	Glu	Ala	Phe	Asp	Phe	Val	Lys	
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 35 40 45
 Cys Pro Asn His Phe Glu Gly His Tyr Gln Tyr Lys Ser Ile Pro Val
 50 55 60
 Glu Asp Asn His Lys Ala Asp Ile Ser Ser Trp Phe Asn Glu Ala Ile
 65 70 75 80
 Asp Phe Ile Asp Ser Ile Lys Asn Ala Gly Gly Arg Val Phe Val His
 85 90 95
 Cys Gln Ala Gly Ile Ser Arg Ser Ala Thr Ile Cys Leu Ala Tyr Leu
 100 105 110
 Met Arg Thr Asn Arg Val Lys Leu Asp Glu Ala Phe Glu Phe Val Lys
 115 120 125
 Gln Arg Arg Ser Ile Ile Ser Pro Asn Phe Ser Phe Met Gly Gln Leu
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 Leu Gln Phe Glu Ser Gln Val Leu Ala Pro
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<210> 9
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 35 40 45
 Cys Pro Asn His Phe Glu Gly His Tyr Gln Tyr Lys Cys Ile Pro Val
 50 55 60
 Glu Asp Asn His Lys Ala Asp Ile Ser Ser Trp Phe Met Glu Ala Ile
 65 70 75 80
 Glu Tyr Ile Asp Ala Val Lys Asp Cys Arg Gly Arg Val Leu Val His
 85 90 95
 Cys Gln Ala Gly Ile Ser Arg Ser Ala Thr Ile Cys Leu Ala Tyr Leu
 100 105 110
 Met Met Lys Lys Arg Val Arg Leu Glu Glu Ala Phe Glu Phe Val Lys
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 35 40 45
 Thr Ser Glu Ala Cys Met Thr His Leu His Tyr Lys Trp Ile Pro Val
 50 55 60
 Glu Asp Ser His Thr Ala Asp Ile Ser Ser His Phe Gln Glu Ala Ile
 65 70 75 80
 Asp Phe Ile Asp Cys Val Arg Glu Lys Gly Gly Lys Val Leu Val His
 85 90 95
 Cys Glu Ala Gly Ile Ser Arg Ser Pro Thr Ile Cys Met Ala Tyr Leu
 100 105 110
 Met Lys Thr Lys Gln Phe Arg Leu Lys Glu Ala Phe Asp Tyr Ile Lys
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 35 40 45
 Arg Ser Phe Met His Val Asn Thr Asn Ala Asn Phe Tyr Lys Asp Ser
 50 55 60
 Gly Ile Thr Tyr Leu Gly Ile Lys Ala Asn Asp Thr Gln Glu Phe Asn
 65 70 75 80
 Leu Ser Ala Tyr Phe Glu Arg Ala Ala Asp Phe Ile Asp Gln Ala Leu
 85 90 95
 Ala Gln Lys Asn Gly Arg Val Leu Val His Cys Arg Glu Gly Tyr Ser
 100 105 110
 Arg Ser Pro Thr Leu Val Ile Ala Tyr Leu Met Met Arg Gln Lys Met
 115 120 125
 Asp Val Lys Ser Ala Leu Ser Ile Val Arg Gln Asn Arg Glu Ile Gly
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 Ala Lys Glu

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 35 40 45
 Arg Leu Trp Asp Glu Glu Ser Ala Gln Leu Leu Pro His Trp Lys Glu
 50 55 60
 Thr His Arg Phe Ile Glu Ala Ala Arg Ala Gln Gly Thr His Val Leu
 65 70 75 80
 Val His Cys Lys Met Gly Val Ser Arg Ser Ala Ala Thr Val Leu Ala
 85 90 95
 Tyr Ala Met Lys Gln Tyr Glu Cys Ser Leu Glu Gln Ala Leu Arg His
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 35 40 45
 Ser Gln Arg Ser Asn Arg Thr Arg Tyr Leu Val Ile Ala Ser Arg Ser
 50 55 60
 Cys Cys Arg Ser Gly Thr Ser Asp Arg Arg Arg His Arg Ile Met Arg
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 His His Ser Val Lys Val Gly Gly Ser Ala Gly Thr Lys Ser Ser Thr
 85 90 95
 Ser Pro Ala Val Pro Thr Gln Arg Gln Leu Ser Val Glu Gln Thr Ala
 100 105 110
 Thr Glu Ala Ser Ser Lys Cys Asp Lys Thr Ala Asp Lys Glu Asn Ala
 115 120 125
 Thr Ala Ala Gly Asp Asn Lys Asn Thr Ser Gly Met Glu Glu Ser Cys
 130 135 140
 Leu Leu Gly Ile Asp Cys Asn Glu Arg Thr Thr Ile Gly Leu Val Val

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225					230				235					240	
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Gly	Gln	Met	Asp	Ala	Pro	Thr	Lys	Ile	Phe	Glu	His	Val	Tyr	Leu	Gly
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	370					375				380					
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Ala	Glu	Gly	Ser	Lys	Val	Leu	Val	His	Cys	Lys	Met	Gly	Val	Ser	Arg
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Ser	Ala	Ser	Val	Val	Ile	Ala	Tyr	Ala	Met	Lys	Ala	Tyr	Gln	Trp	Glu
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Phe	Gln	Gln	Ala	Leu	Glu	His	Val	Lys	Lys	Arg	Arg	Ser	Cys	Ile	Lys
	435					440						445			
Pro	Asn	Lys	Asn	Phe	Leu	Asn	Gln	Leu	Glu	Thr	Tyr	Ser	Gly	Met	Leu
	450					455					460				
Asp	Ala	Met	Lys	Asn	Lys	Glu	Lys	Leu	Gln	Arg	Ser	Lys	Ser	Glu	Thr
465					470					475					480
Asn	Leu	Lys	Ser	Thr	Lys	Asp	Ala	Arg	Leu	Leu	Pro	Gly	Ser	Glu	Pro
				485					490					495	
Thr	Pro	Leu	Ile	Gln	Ala	Leu	Asn	Gln	Ala	Lys	Ser	Lys	Ser	Thr	Gly
			500					505					510		
Glu	Ala	Gly	Val	Thr	Pro	Asp	Gly	Glu	Glu	Glu	Asp	Gly	Ser	Arg	Met
	515						520					525			
His	Arg	Arg	Ser	Ile	Ala	Gln	Lys	Ser	Gln	Arg	Arg	Met	Val	Arg	Arg
	530					535				540					
Ser	Ser	Ser	Thr	Ser	Pro	Lys	Thr	Gln	Thr	Ala	Val	Val	Thr	Lys	Gln
545					550					555					560
Gln	Ser	Gln	Ser	Met	Glu	Asn	Leu	Thr	Pro	Glu	Arg	Ser	Val	Ala	Glu
				565					570					575	
Glu	Pro	Lys	Asn	Met	Arg	Phe	Pro	Gly	Ser	Asn	Gly	Glu	Asn	Tyr	Ser
			580					585					590		
Val	Thr	Gln	Asn	Gln	Val	Leu	His	Ile	Gln	Lys	His	Thr	Pro	Leu	Ser
		595				600						605			

Val	Arg	Thr	Arg	Ile	His	Asp	Leu	Glu	Ala	His	Arg	Ala	Asp	Gln	Leu
610						615					620				
Pro	Gln	Gln	Pro	Val	Trp	Thr	Ser	Leu	Thr	Lys	Leu	Ile	Thr	Gln	Thr
625					630					635					640
Ser	His	Leu	Gly	Lys	Ser	Val	Ser	Gly	Ser	Ser	Ser	Gly	Asn	Ile	Asp
				645					650					655	
Ser	Arg	Arg	Asp	Ser	Ser	Cys	Ser	Asp	Val	Phe	Ser	Ser	Gln	Val	Asp
			660					665					670		
Ser	Val	Phe	Ala	Lys	Asp	Glu	Gly	Glu	Lys	Arg	Gln	Arg	Arg	Lys	Thr
		675					680					685			
His	Ser	Trp	Thr	Glu	Ser	Leu	Gly	Pro	Ser	Gly	Gly	Ile	Val	Leu	Asp
690						695				700					
Pro	Thr	Pro	Gln	Gln	Gln	Lys	Gln	Gln	Ser	Asn	Ala	Ile	Leu	Arg	Pro
705					710					715					720
Arg	Gly	Thr	Arg	Gln	Arg	Glu	Leu	Pro	Ser	Arg	His	Ala	Ser	Trp	Gly
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Ser

<210> 14
 <211> 509
 <212> PRT
 <213> Homo sapiens

<400> 14

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			20				25					30			
Ala	Val	Ile	Ser	Gln	Asn	Ala	Ile	Asn	Gln	Leu	Ile	Ser	Glu	Ser	Phe
		35				40					45				
Leu	Thr	Val	Lys	Gly	Ala	Ala	Leu	Phe	Leu	Pro	Arg	Gly	Asn	Gly	Ser
50					55					60					
Ser	Thr	Pro	Arg	Ile	Ser	His	Arg	Arg	Asn	Lys	His	Ala	Gly	Asp	Leu
65				70					75					80	
Gln	Gln	His	Leu	Gln	Ala	Met	Phe	Ile	Leu	Leu	Arg	Pro	Glu	Asp	Asn
			85						90				95		
Ile	Arg	Leu	Ala	Val	Arg	Leu	Glu	Ser	Thr	Tyr	Gln	Asn	Arg	Thr	Arg
		100						105					110		
Tyr	Met	Val	Val	Val	Ser	Thr	Asn	Gly	Arg	Gln	Asp	Thr	Glu	Glu	Ser
	115					120					125				
Ile	Val	Leu	Gly	Met	Asp	Phe	Ser	Ser	Asn	Asp	Ser	Ser	Thr	Cys	Thr
130				135					140						
Met	Gly	Leu	Val	Leu	Pro	Leu	Trp	Ser	Asp	Thr	Leu	Ile	His	Leu	Asp
145				150					155						160
Gly	Asp	Gly	Gly	Phe	Ser	Val	Ser	Thr	Asp	Asn	Arg	Val	His	Ile	Phe
			165						170					175	
Lys	Pro	Val	Ser	Val	Gln	Ala	Met	Trp	Ser	Ala	Leu	Gln	Ser	Leu	His
		180					185						190		
Lys	Ala	Cys	Glu	Val	Ala	Arg	Ala	His	Asn	Tyr	Tyr	Pro	Gly	Ser	Leu
	195				200							205			
Phe	Leu	Thr	Trp	Val	Ser	Tyr	Tyr	Glu	Ser	His	Ile	Asn	Ser	Asp	Gln
210					215						220				
Ser	Ser	Val	Asn	Glu	Trp	Asn	Ala	Met	Gln	Asp	Val	Gln	Ser	His	Arg
225				230					235						240
Pro	Asp	Ser	Pro	Ala	Leu	Phe	Thr	Asp	Ile	Pro	Thr	Glu	Arg	Glu	Arg

Thr	Glu	Arg	Leu	245	Ile	Lys	Thr	Lys	Leu	250	Arg	Glu	Ile	Met	255	Met	Gln	Lys
			260						265						270			
Asp	Leu	Glu	Asn	Ile	Thr	Ser	Lys	Glu	Ile	Arg	Thr	Glu	Leu	Glu	Met			
		275					280							285				
Gln	Met	Val	Cys	Asn	Leu	Arg	Glu	Phe	Lys	Glu	Phe	Ile	Asp	Asn	Glu			
	290						295					300						
Met	Ile	Val	Ile	Leu	Gly	Gln	Met	Asp	Ser	Pro	Thr	Gln	Ile	Phe	Glu			
305					310					315					320			
His	Val	Phe	Leu	Gly	Ser	Glu	Trp	Asn	Ala	Ser	Asn	Leu	Glu	Asp	Leu			
				325					330					335				
Gln	Asn	Arg	Gly	Val	Arg	Tyr	Ile	Leu	Asn	Val	Thr	Arg	Glu	Ile	Asp			
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Asn	Phe	Phe	Pro	Gly	Val	Phe	Glu	Tyr	His	Asn	Ile	Arg	Val	Tyr	Asp			
		355					360					365						
Glu	Glu	Ala	Thr	Asp	Leu	Leu	Ala	Tyr	Trp	Asn	Asp	Thr	Tyr	Lys	Phe			
	370					375					380							
Ile	Ser	Lys	Ala	Lys	Lys	His	Gly	Ser	Lys	Cys	Leu	Val	His	Cys	Lys			
385				390						395					400			
Met	Gly	Val	Ser	Arg	Ser	Ala	Ser	Thr	Val	Ile	Ala	Tyr	Ala	Met	Lys			
				405					410					415				
Glu	Tyr	Gly	Trp	Asn	Leu	Asp	Arg	Ala	Tyr	Asp	Tyr	Val	Lys	Glu	Arg			
			420					425					430					
Arg	Thr	Val	Thr	Lys	Pro	Asn	Pro	Ser	Phe	Met	Arg	Gln	Leu	Glu	Glu			
		435					440					445						
Tyr	Gln	Gly	Ile	Leu	Leu	Ala	Ser	Phe	Leu	Gly	Leu	Ile	His	Gly	Gly			
	450					455					460							
Arg	Asp	Lys	Pro	Trp	Gly	Glu	Lys	Ser	Thr	Glu	Phe	Glu	Ser	Val	Asp			
465					470					475					480			
Leu	Val	Ser	Ile	Pro	Gly	Ser	Pro	Ser	Cys	Cys	Asn	Pro	Glu	Lys	Leu			
				485					490					495				
Leu	His	Ile	Ser	His	Pro	Tyr	Leu	Thr	Pro	Ser	Ile	Lys						
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<210> 15
 <211> 552
 <212> PRT
 <213> Homo sapiens

<400> 15																		
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			20					25					30					
Val	Ser	Val	Gln	Ala	Met	Trp	Ser	Ala	Leu	Gln	Val	Leu	His	Lys	Ala			
		35					40					45						
Cys	Glu	Val	Ala	Arg	Arg	His	Asn	Tyr	Phe	Pro	Gly	Gly	Val	Ala	Leu			
	50					55				60								
Ile	Trp	Ala	Thr	Tyr	Tyr	Glu	Ser	Cys	Ile	Ser	Ser	Glu	Gln	Ser	Cys			
65					70				75					80				
Ile	Asn	Glu	Trp	Asn	Ala	Met	Gln	Asp	Leu	Glu	Ser	Thr	Arg	Pro	Asp			
				85				90						95				
Ser	Pro	Ala	Leu	Phe	Val	Asp	Lys	Pro	Thr	Glu	Gly	Glu	Arg	Thr	Glu			
			100					105					110					
Arg	Leu	Ile	Lys	Ala	Lys	Leu	Arg	Ser	Ile	Met	Met	Ser	Gln	Asp	Leu			
		115					120					125						

Glu	Asn	Val	Thr	Ser	Lys	Glu	Ile	Arg	Asn	Glu	Leu	Glu	Lys	Gln	Met
130						135					140				
Asn	Cys	Asn	Leu	Lys	Glu	Leu	Lys	Glu	Phe	Ile	Asp	Asn	Glu	Met	Leu
145					150					155					160
Leu	Ile	Leu	Gly	Gln	Met	Asp	Lys	Pro	Ser	Leu	Ile	Phe	Asp	His	Leu
				165					170					175	
Tyr	Leu	Gly	Ser	Glu	Trp	Asn	Ala	Ser	Asn	Leu	Glu	Glu	Leu	Gln	Gly
			180					185						190	
Ser	Gly	Val	Asp	Tyr	Ile	Leu	Asn	Val	Thr	Arg	Glu	Ile	Asp	Asn	Phe
		195					200					205			
Phe	Pro	Gly	Leu	Phe	Ala	Tyr	His	Asn	Ile	Arg	Val	Tyr	Asp	Glu	Glu
	210					215					220				
Thr	Thr	Asp	Leu	Leu	Ala	His	Trp	Asn	Glu	Ala	Tyr	His	Phe	Ile	Asn
225					230					235					240
Lys	Ala	Lys	Arg	Asn	His	Ser	Lys	Cys	Leu	Val	His	Cys	Lys	Met	Gly
				245					250					255	
Val	Ser	Arg	Ser	Ala	Ser	Thr	Val	Ile	Ala	Tyr	Ala	Met	Lys	Glu	Phe
			260					265					270		
Gly	Trp	Pro	Leu	Glu	Lys	Ala	Tyr	Asn	Tyr	Val	Lys	Gln	Lys	Arg	Ser
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Ile	Thr	Arg	Pro	Asn	Ala	Gly	Phe	Met	Arg	Gln	Leu	Ser	Glu	Tyr	Glu
	290					295					300				
Gly	Ile	Leu	Asp	Ala	Ser	Lys	Gln	Arg	His	Asn	Lys	Leu	Trp	Arg	Gln
305					310					315					320
Gln	Thr	Asp	Ser	Ser	Leu	Gln	Gln	Pro	Val	Asp	Asp	Pro	Ala	Gly	Pro
				325					330					335	
Gly	Asp	Phe	Leu	Pro	Glu	Thr	Pro	Asp	Gly	Thr	Pro	Glu	Ser	Gln	Leu
			340					345						350	
Pro	Phe	Leu	Asp	Asp	Ala	Ala	Gln	Pro	Gly	Leu	Gly	Pro	Pro	Leu	Pro
		355					360					365			
Cys	Cys	Phe	Arg	Arg	Leu	Ser	Asp	Pro	Leu	Leu	Pro	Ser	Pro	Glu	Asp
	370					375					380				
Glu	Thr	Gly	Ser	Leu	Val	His	Leu	Glu	Asp	Pro	Glu	Arg	Glu	Ala	Leu
385					390					395					400
Leu	Glu	Glu	Ala	Ala	Pro	Pro	Ala	Glu	Val	His	Arg	Pro	Ala	Arg	Gln
			405					410						415	
Pro	Gln	Gln	Gly	Ser	Gly	Leu	Cys	Glu	Lys	Asp	Val	Lys	Lys	Lys	Leu
			420					425					430		
Glu	Phe	Gly	Ser	Pro	Lys	Gly	Arg	Ser	Gly	Ser	Leu	Leu	Gln	Val	Glu
		435					440					445			
Glu	Thr	Glu	Arg	Glu	Glu	Gly	Leu	Gly	Ala	Gly	Arg	Trp	Gly	Gln	Leu
	450					455					460				
Pro	Thr	Gln	Leu	Asp	Gln	Asn	Leu	Leu	Asn	Ser	Glu	Asn	Leu	Asn	Asn
465					470					475					480
Asn	Ser	Lys	Arg	Ser	Cys	Pro	Asn	Gly	Met	Glu	Val	Gly	Arg	Ala	Arg
				485					490					495	
Pro	Ala	Gly	Trp	His	Thr	Pro	Ser	Leu	Pro	Ser	His	Ser	Asn	Trp	Pro
			500					505						510	
Thr	Ser	Ala	Ser	Val	Val	Gly	Thr	Thr	Gly	Thr	Arg	His	His	Thr	Gln
		515					520					525			
Leu	Ile	Phe	Phe	Tyr	Cys	Leu	Leu	Trp	Ala	Pro	Ser	Ser	His	Leu	Gln
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Gly	Pro	Glu	Gly	Ser	Phe	Thr	Gly								
545					550										

<211> 10
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 <213> Homo sapiens

<400> 16
 Val His Cys Lys Met Gly Val Ser Arg Ser
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<210> 17
 <211> 24
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Conserved homology region from eight DSPs having
 MAP-kinase phosphatase activity

<400> 17
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 Thr Asn Ile Leu Ala Tyr Leu Met
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<210> 18
 <211> 22
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 <213> Homo sapiens

<400> 18
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 Leu Ala Tyr Ala Met Lys
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<210> 19
 <211> 30
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Primer

<400> 19
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30

<210> 20
 <211> 1416
 <212> DNA
 <213> Mus musculus

<400> 20
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 ccctggggacc aggcggtcca gcgaaggagt cgactccagc gaaggcagag ctttgcggtg 120
 ctccgtgggg ctgtcctggg actgcaggat ggaggggaca atgatgatgc agcagaggcc 180

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atggtacagc tgctgaggcc gcaggatgac atccgcctgg cagcccagct ggaggcacc 360
cggcctcccc ggctccgcta cctgctggtg gtttctacac gagaaggaga aggtctgagc 420
caggatgaga cggctcctct gggcgtggat ttccctgaca gcagctcccc cagctgcacc 480
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gcggccacag tgctggccta tgccatgaag cagtacgaat gcagcctgga gcaggccctg 1320
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<210> 21

<211> 471

<212> PRT

<213> Mus musculus

<400> 21

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Gln Arg Arg Gln Ser Phe Ala Val Leu Arg Gly Ala Val Leu Gly Leu
 35          40          45
Gln Asp Gly Gly Asp Asn Asp Asp Ala Ala Glu Ala Ser Ser Glu Pro
 50          55          60
Thr Glu Lys Ala Pro Ser Glu Glu Glu Leu His Gly Asp Gln Thr Asp
 65          70          75          80
Phe Gly Gln Gly Ser Gln Ser Pro Gln Lys Gln Glu Glu Gln Arg Gln
 85          90          95
His Leu His Leu Met Val Gln Leu Leu Arg Pro Gln Asp Asp Ile Arg
 100          105          110
Leu Ala Ala Gln Leu Glu Ala Pro Arg Pro Pro Arg Leu Arg Tyr Leu
 115          120          125
Leu Val Val Ser Thr Arg Glu Gly Glu Gly Leu Ser Gln Asp Glu Thr
 130          135          140
Val Leu Leu Gly Val Asp Phe Pro Asp Ser Ser Ser Pro Ser Cys Thr
 145          150          155          160
Leu Gly Leu Val Leu Pro Leu Trp Ser Asp Thr Gln Val Tyr Leu Asp
 165          170          175
Gly Asp Gly Gly Phe Ser Val Thr Ser Gly Gly Gln Ser Arg Ile Phe
 180          185          190
Lys Pro Ile Ser Ile Gln Thr Met Trp Ala Thr Leu Gln Val Leu His
 195          200          205
Gln Ala Cys Glu Ala Ala Leu Gly Ser Gly Leu Val Pro Gly Gly Ser
 210          215          220
Ala Leu Thr Trp Ala Ser His Tyr Gln Glu Arg Leu Asn Ser Glu Gln

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225		230		235		240
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Pro Pro Ser Ala Glu Pro Gly Gly Ser Ser Glu Gln Glu Gln Met Glu						
	260		265		270	
Gln Ala Ile Arg Ala Glu Leu Trp Lys Val Leu Asp Val Ser Asp Leu						
	275		280		285	
Glu Ser Val Thr Ser Lys Glu Ile Arg Gln Ala Leu Glu Leu Arg Leu						
	290		295		300	
Gly Leu Pro Leu Gln Gln Tyr Arg Asp Phe Ile Asp Asn Gln Met Leu						
305		310		315		320
Leu Leu Val Ala Gln Arg Asp Arg Ala Ser Arg Ile Phe Pro His Leu						
	325		330		335	
Tyr Leu Gly Ser Glu Trp Asn Ala Ala Asn Leu Glu Glu Leu Gln Arg						
	340		345		350	
Asn Arg Val Thr His Ile Leu Asn Met Ala Arg Glu Ile Asp Asn Phe						
	355		360		365	
Tyr Pro Glu Arg Phe Thr Tyr His Asn Val Arg Leu Trp Asp Glu Glu						
	370		375		380	
Ser Ala Gln Leu Leu Pro His Trp Lys Glu Thr His Arg Phe Ile Glu						
385		390		395		400
Ala Ala Arg Ala Gln Gly Thr His Val Leu Val His Cys Lys Met Gly						
	405		410		415	
Val Ser Arg Ser Ala Ala Thr Val Leu Ala Tyr Ala Met Lys Gln Tyr						
	420		425		430	
Glu Cys Ser Leu Glu Gln Ala Leu Arg His Val Gln Glu Leu Arg Pro						
	435		440		445	
Ile Ala Arg Pro Asn Pro Gly Phe Leu Arg Gln Leu Gln Ile Tyr Gln						
	450		455		460	
Gly Ile Leu Thr Ala Arg Thr						
465		470				

<210> 22
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 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Primer

<400> 22
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24

<210> 23
 <211> 27
 <212> DNA
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<220>
 <223> Primer

<400> 23
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27

<210> 24
 <211> 28

<212> DNA
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<220>
 <223> Primer

<400> 24
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28

<210> 25
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<220>
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<400> 25
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27

<210> 26
 <211> 23
 <212> DNA
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<220>
 <223> Primer

<400> 26
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23

<210> 27
 <211> 6
 <212> PRT
 <213> Homo sapiens

<400> 27
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